

ANCIENT JEWISH CALENDATION: A CRITICISM

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IN AN article in this JOURNAL (61 [1942] 227-80) Miss Grace Amadon has presented a theory of ancient Jewish calendation strikingly at variance with the commonly accepted idea that observation of the crescent was the controlling factor in beginning the Jewish months and year. It is the purpose of the writer to bring forward certain objections to this new theory.

Since Miss Amadon is primarily interested in the crucifixion period let us first of all tabulate the data which determine the 1st of Nisan for the years A. D. 28 to 34 from the standpoint of the first possible visibility of the crescent at Jerusalem.

Year	Conjunction	Hours that must elapse before crescent can be visible	Nisan 1 ¹	Latitude of moon at conjunction
28	Apr. 13, 4:40 P. M.	21.6	Apr. 15	-4°92
29	Apr. 2, 8:01 P. M.	23.6	Apr. 5	-4°74
30	Mar. 22, 8:13 P. M.	23.6	Mar. 25	-4°49
31	Apr. 10, 2:00 P. M.	22.5	Apr. 12	-2°13
32	Mar. 29, 10:27 P. M.	19.9	Apr. 1	-1°46
33	Apr. 17, 9:38 P. M.	18.5	Apr. 19	+1°82
34	Apr. 7, 2:07 P. M.	17.1	Apr. 9	+2°48

This tabulation has been made by the use of the new moon tables of Carl Schoch in *The Venus Tablets of Ammizaduga* (Oxford, 1928). While these tables are particularly for Babylon they may also be used for Jerusalem because of the very slight difference in latitude (Babylon, 32°5; Jerusalem, 31°8).² Cor-

¹ In each case Nisan 1 actually begins with sunset of the day before, but this is the conventional way of dating according to the Julian calendar.

² Cf. Schoch, *Ammizaduga*, 94.

rection for the difference in longitude requires that 37 minutes be subtracted from the time of conjunction at Babylon to give the correct time of conjunction at Jerusalem. Schoch's tables G and H permit the calculation of the hours that must elapse between the conjunction and the visibility of the new crescent on the following day. Thus in A. D. 28 the period from conjunction to 6:00 P. M. of the next day is 25 hours, 20 minutes. Since only 21.6 hours are necessary, the crescent will surely be visible on the evening of April 14, weather permitting, and April 15 will be Nisan 1.

The dates for Nisan 1 tabulated above are the same as those on which the Passover Graph II (p. 267) is based. This is the graph labelled *False* by Miss Amadon and she further states (p. 268): "And neither is the conclusion valid that Graph II represents an 'observed' new moon in ancient times." But that is exactly what Graph II does represent unless Miss Amadon is able to demonstrate that Schoch's new moon tables have been incorrectly compiled and give inaccurate results. If that is her opinion it is certainly not shared by other astronomers and chronologers.³

Miss Amadon's conclusion derives from her belief (p. 253) that the most important factor bearing on the length of time from conjunction to visibility (her "translation period") is the moon's anomaly as revealed in its waxing period (the time from conjunction to full moon). Let us assume, for the moment, that she is correct and that an increase in the waxing period should be reflected in a corresponding increase in the translation period. Her Table I gives the following figures:

Year	Translation Period (Days)	Waxing Period (Days)
28	1.09	13.94
29	1.95	14.39
30	2.92	15.09
31	3.19	15.36

As the moon's anomaly increases, it apparently slows down and takes longer to reach full moon. Thus in A. D. 31 it requires 1.42

³ Cf. Fotheringham, *Ammizaduga*, passim; P. V. Neugebauer, *Astronomische Chronologie* (Berlin, 1929), I, 34.

more days to become full than in A. D. 28, an increase of 10.1%. The translation period for the same years, however, has increased by 2.10 days or 192.6%. Clearly the only *necessary* increase would be 10.1% of 1.09, giving a translation period for A. D. 31 of 1.20 days, which would place Nisan 1 on April 12, in agreement with our table and two days in advance of Miss Amadon's date.

It will be noted that our table of required hours does not increase by 10.1% between A. D. 28 and 31. That is because (*contra* Miss Amadon) there is another element in the moon's movement, its latitude, which is of equal importance with its anomaly. Schoch states (*Ammizaduga*, 97): "In spring the mean anomaly of the moon is of the same importance as her latitude, but in autumn her latitude is far more important." Thus in our table the lengthening waxing period of the moon may be reflected in an increase in the number of hours necessary for visibility, or in a movement of the latitude of the moon from south toward north of the ecliptic, or in a function of the two. In A. D. 28, for example, the hours for visibility are 21.6 and the latitude of the moon is $-4^{\circ}92$. In A. D. 31, the hours required are 22.5 but the latitude has decreased to $-2^{\circ}13$.

If we now compare the dates for Nisan 1 which depend on first visibility of the crescent and the dates which Miss Amadon proposes we have the following interesting table:

Year	Nisan 1 (First Visibility)	Nisan 1 (Miss Amadon)	Difference
28	Apr. 15	Apr. 15	0
29	Apr. 5	Apr. 5	0
30	Mar. 25	Mar. 26	1
31	Apr. 12	Apr. 14	2
32	Apr. 1	Apr. 2	1
33	Apr. 19	Apr. 21	2
34	Apr. 9	Apr. 10	1

In two years out of seven, Miss Amadon finds it necessary to place Nisan 1 on the third day of lunar visibility. It is inconceivable to the writer that any ancient people using a lunar calendar should follow such a practice.

Miss Amadon is forced to this treatment of lunar visibility by her theory that the 14th of Nisan must follow the astronomical

full moon; but all that her quotations from Jewish and Christian sources really indicate is that the full moon normally occurred sometime on the 14th. It hardly seems necessary to go deeply into this theory as it is sufficient to point out that *nowhere in Jewish law is there set forth any statement of a necessary relationship between the feast of Passover and the full moon.*⁴

Moreover, Miss Amadon has made the error (diagram B, p. 245) of placing the slaying of the paschal lamb on the eve between the 13th and the 14th of Nisan and the Passover supper on the night of the 14th. This results no doubt from her belief that the Last Supper and the Passover supper were one and the same meal (p. 247). But Dr. Feigin has shown that this was not the case;⁵ and we must assume that in the crucifixion year the normal order of events obtained, that the lamb was slain in the late afternoon of the 14th and the Passover supper was eaten that evening, on the 15th.

This, together with the other inconsistencies brought out above, seem to the writer to constitute insuperable objections to the acceptance of Miss Amadon's theory.

⁴ My authority for this statement is Dr. Samuel I. Feigin of the Oriental Institute.

⁵ Samuel I. Feigin, "The Date of the Last Supper" (*Anglican Theological Review*, 25 [1943] 212-17).